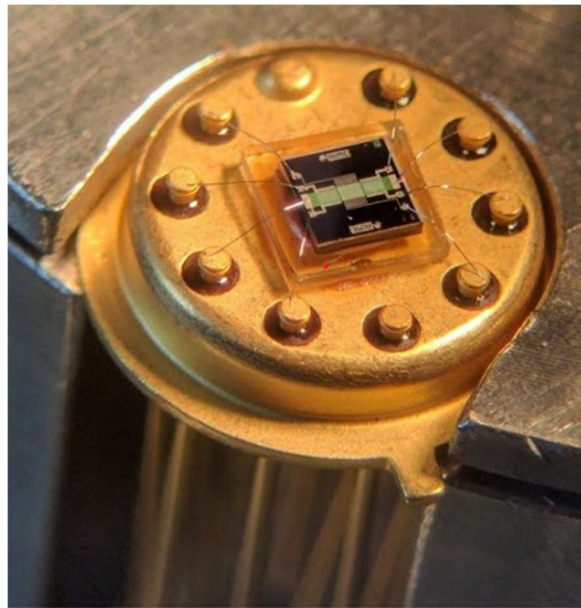


Analog Gas Sensor based on tungsten trioxide nanoparticles



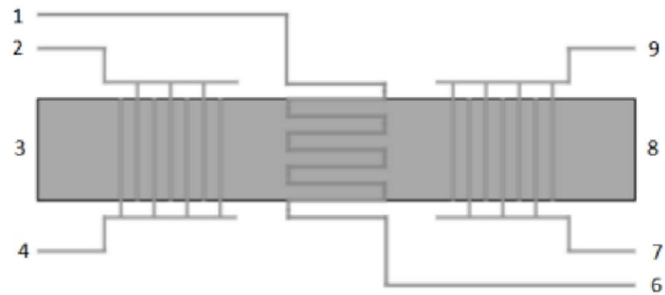
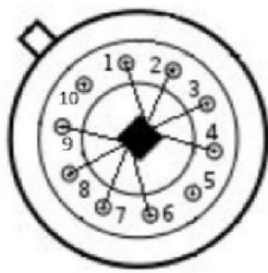
General features:

- Detection of NH₃
- Detection of C₂H₆O
- Easy to use
- Small size
- Low cost
- Integrated heater
- Integrated temperature sensor
- Low power
- Integrate two different gas sensors
- High sensitivity
- Long lifespan

Description:

The BRBGS2023 is a gas sensor developed at AIME Toulouse. It is based on tungsten trioxide nanoparticles and is able to detect several gases including NH₃ and C₂H₆O. It is an analog sensor and is very adaptable and easy to use in your IoT projects. The integrated heater heats the sensor up to 250°C in order to maximize the sensitivity of the nanoparticles and avoid any interference from the humidity of the air and a thermistor is used to help control temperature.

Pin Layout:



Pin	Usage
1 / 6	Temperature Sensor (Aluminum Resistor)
2 / 4	Gas sensor (WO ₃ nanoparticles between aluminum interdigitated combs)
3 / 8	Heater Resistor (Polysilicon resistor)
7 / 9	Gas sensor (WO ₃ nanoparticles between aluminum interdigitated combs)
5 / 10	Not Connected

Specifications:

Type	Chemical Sensor
Gas measurement	Resistive measure
Temperature measurement	Resistive measure
Detectable Gas	<ul style="list-style-type: none">• Ammonia (NH₃)• Ethanol (C₂H₆O)
Diameter	9.5 mm
Composition	<ul style="list-style-type: none">• Silicon• N-doped poly-silicon (heater)• Aluminum• Nanoparticles of tungsten trioxide (WO₃)
Mounting	Through hole fixed
Sensor type	Active (power needed for the heater)

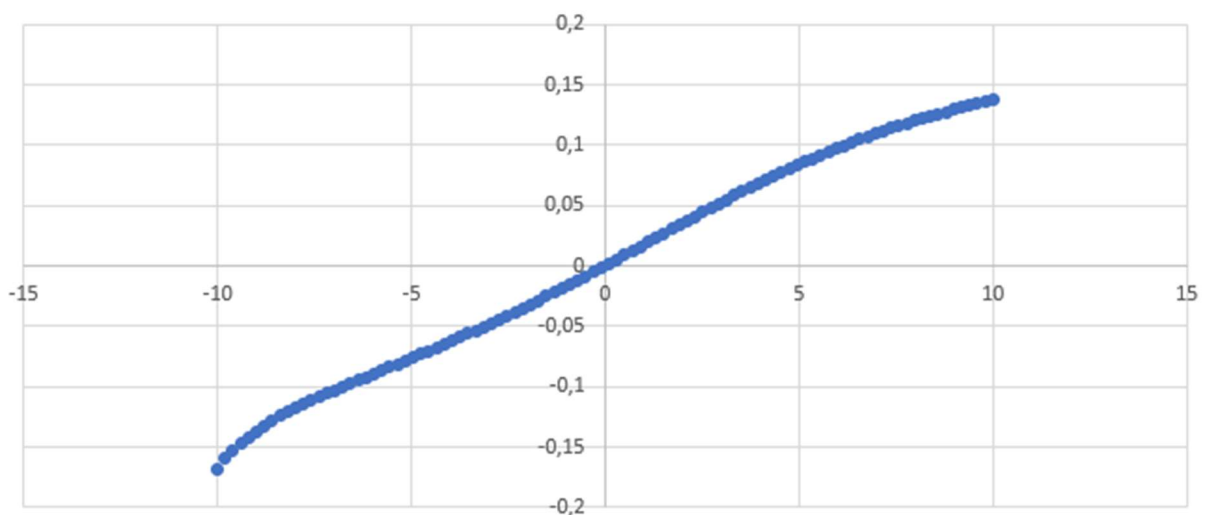
Standard use conditions:

	Unit	Value
Air composition	N2/O2 (%)	80/20
Temperature	°C	20
Humidity	%	60

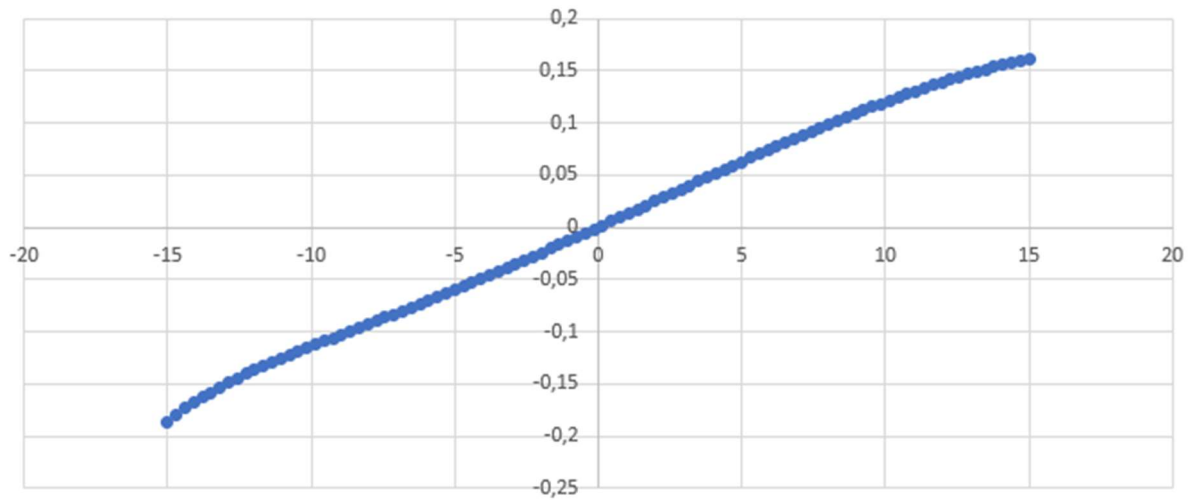
Electrical characteristics at standard conditions:

Name	Unit	Value		
		Min	Nom	Max
R _{gas}	MΩ	1	12	20
R _{thermistor}	Ω	40	64	75
R _{heater}	Ω	80	131	150
Gas sensor voltage	V	-	5	-
Temperature sensor voltage	V	-	5	-
Heater voltage	V	10	12	20

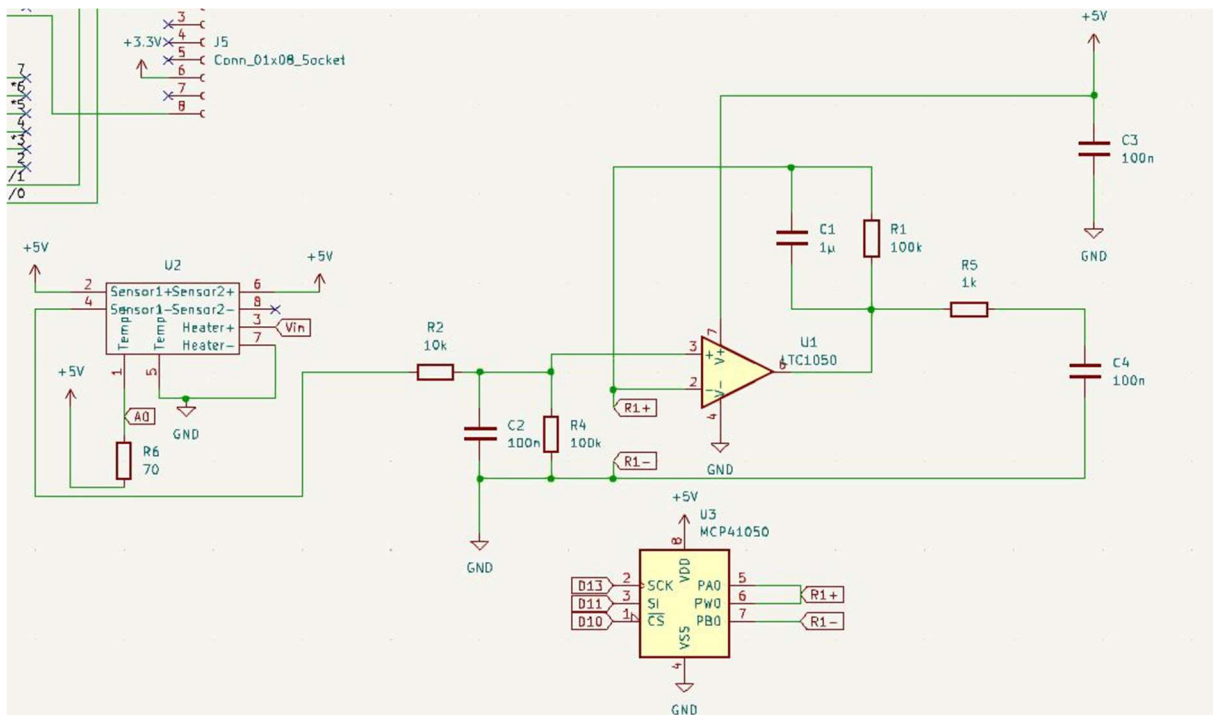
Thermistor resistance at 20°C:



Heater resistance at 20°C:



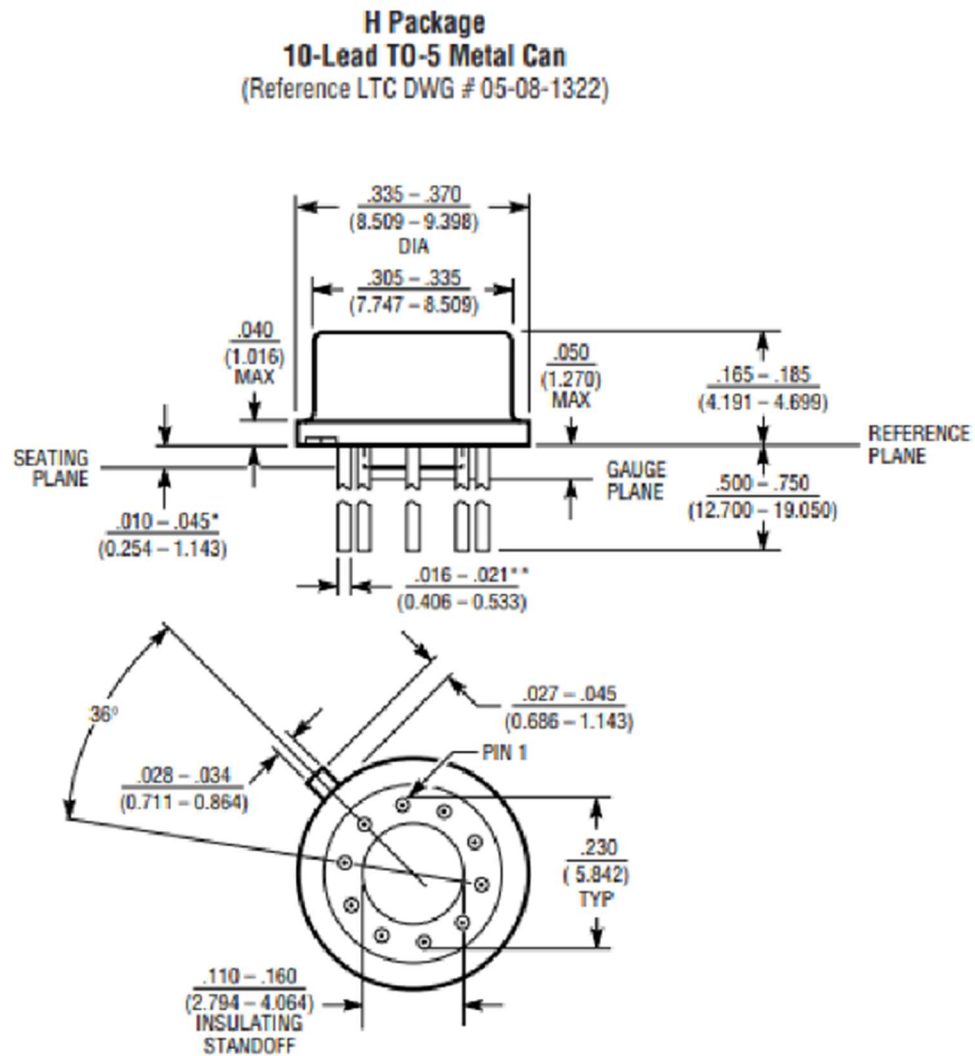
Integration Example :



Here, the sensor is connected to circuit to shape the signal. It uses an amplifier to make the signal readable and some filters, to reduce noise and make it easier to retrieve the measure. For this, we used a LTC1050 operational amplifier.

Package and dimensions:

This sensor uses a 10-Lead TO-5 Metal can package with the following dimensions:



*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND THE SEATING PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $.016 - .024$ (0.406 - 0.610)

W10(70-5) 0004